

~~TOP SECRET~~

NATIONAL SECURITY AGENCY  
FORT GEORGE G. MEADE, MARYLAND

# CRYPTOLOG

## OCTOBER 1979



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P.L. 86-36

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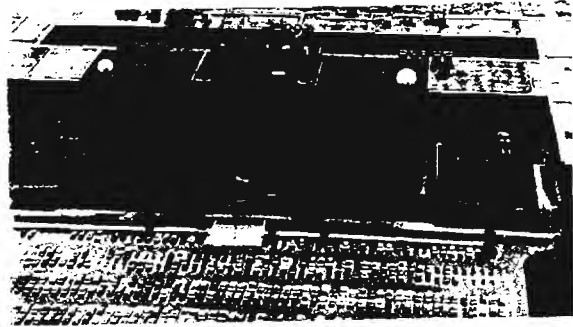
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# Snowballs on the Roof

## Vera Filby, E41



**E**very day thousands of NSA people see the snowballs, dishes, masts, and other odds and ends on and near our various buildings, and many of us have wondered what they are and what they do. *CRYPTOLOG* cannot provide all the answers, because some of these installations are experimental and sensitive, but we herewith offer you, dear Reader, our contribution toward an NSA Roofwatchers Guide.

(U) Roofwatching for most of us is more frustrating than rewarding because it's so hard to identify the objects that appear and sometimes later disappear. Birdwatchers have fieldbooks; even beginners can learn to tell starlings from grackles, and study of field marks will teach them that the little gray bird with the crest must be a titmouse. Wild plant fanciers have their fieldbooks too and can go on rambles with naturalists who know what they are looking at. Soon they can distinguish white oak from black, and they can tell the difference between tickseed and sneezeweed in September fields. And for other watchers there are manuals and even silhouette books for ships, boats, airplanes; even pictures of radars are not hard to come by. But fieldguides for antennas? There's no such thing.

(U) Try the library. You can find lots of books on antennas, and some of them are supposed to be elementary. In them you will find copious data on radio wave propagation and an abundance of radiation diagrams and mathematical formulas. But pictures that identify and explain the mast with the flock of flying Vs on top or the thing that looks like an upside-down open-ended pyramid? Not so easy.

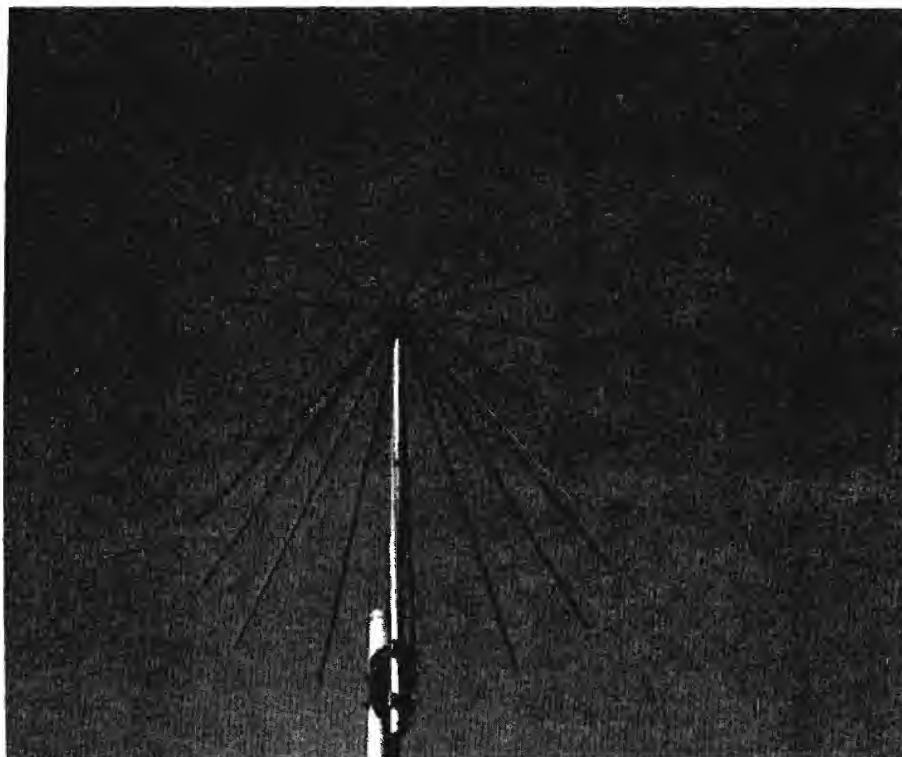
(U) But then nothing about antennas is easy, and the multiplicity of their design and the changing state of antenna art add to the complexity. Of types there are monopoles and dipoles, linear arrays, spiral and helical an-

tennas, horn antennas, loop antennas, slot antennas, etc., etc. — with variations and combinations and modification. Besides that, terminology varies, and if in your guidebook hunt you should get hold of a British text, you would find yet another collection of terms.

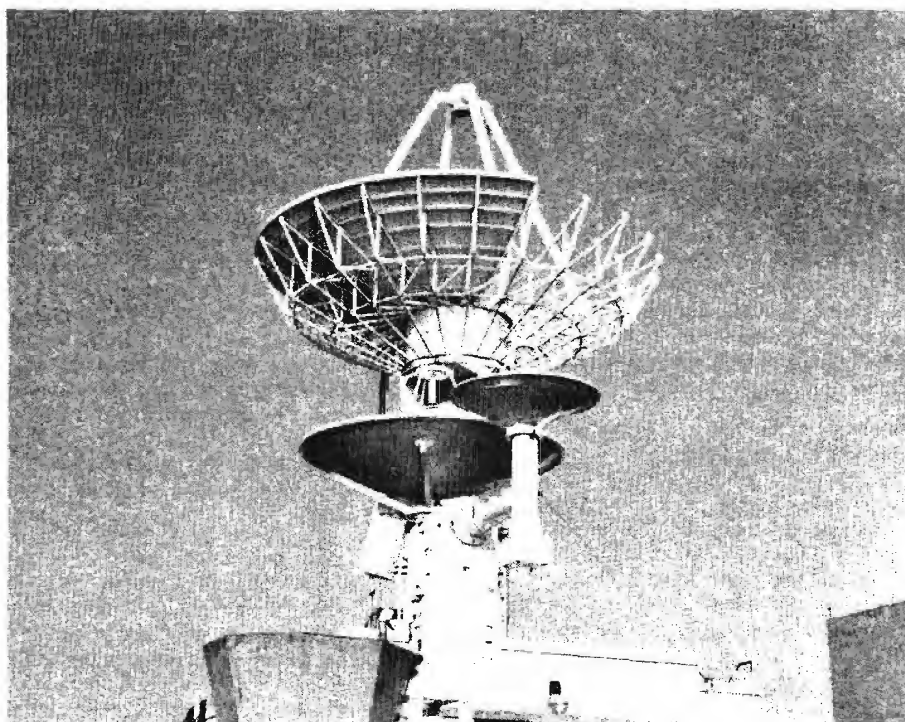
~~(S-ECU)~~ Nevertheless, anyone who understands antennas can tell a lot about an antenna just by looking at it, and a radio engineer doesn't need a security clearance to guess at the frequency range an antenna is designed for or even to deduce the target of an intercept site. Elliot Glunt of the Telecommunications and Computer Services Organization staff has a story to illustrate that. In World War II he was ordered to Guam to take charge of the Joint Communications Activity (JCA). It soon became apparent to him that there was considerably more communications activity on the JCA base than he had cognizance over. Since this was known as a "spook outfit," officially titled U. S. Naval Communications Supplementary Radio Station, direct questions as to the activity went unanswered. (Need-to-know, fences — that sort of thing.) By using some overgrown jungle trails, he made his way to their antenna field, where he saw, among other antennas, 27 rhombic arrays, all aligned for reception to the north and northwest, and an HF/DF array. It became crystal clear to that unindoctrinated viewer that the transmitting areas must be in Siberia, China, and Japan.

~~(C)~~ For the would-be roofwatcher and frustrated bookhunter, then, the best thing to do is ask people who know, and you couldn't do better than get acquainted with [redacted] of the Antenna Services activity, part of the Telecommunications and Computer Services Organization. The work center he directs is very small, but the job they do is very big. They are responsible for installing and maintaining the nearly 100 antennas on the roofs of

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Discone Antenna



One of the TRIO Antennas Under Construction

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NSA's Fort Meade and Friendship Annex buildings, and more of them elsewhere. (We may get to "elsewhere" in future installments, especially if Bob flies us there in his glider or light aircraft.) This job entails, among many other things, support from contractors, since most of the equipment is commercially produced, and it can be rather more adventurous than most of us sedentary NSA types are accustomed to, as, for example, the installation of the big dishes on the south side of the old Operations Building on an icy pad by heavy helicopter on a winter day with snow threatening. Adding to the complexity of the job is the fact that the antennas on the roofs belong to a variety of "owners" — not only the Telecommunications and Computer Services and the Research and Engineering Organizations, as you would expect, but also many elements of Operations as well as Management Services, Installations and Logistics, Communications Security, and the National Cryptologic School.

(C) Bob can take you for a tour of the Headquarters Building roof, an exhilarating experience on a bright winter day, with a sharp wind blowing and swirling white and gold clouds of vapor billowing out of the cooling towers, and nobody there to enjoy it but the pigeons, who unquestionably have the best view for miles around. Were they so inclined, they could observe a most interesting sight by peering down into the wooden towers through the warm, roiling mists at the slanted rim of icicles inside and the water churning in the dark below. Outside, great long icicles hang in the shadow of the tower walls. The towers are made of wood, by the way, because cedar and redwood withstand the changes of temperature and the effects of moisture more satisfactorily than anything else. Other objects on the roof include stairway penthouses, air-conditioning outlets, weather instruments, grounding rods, and TV cameras for monitoring the parking lots.

(U) But the most conspicuous roof decorations atop Headquarters Building are the big balls, variously referred to as snowballs, golfballs, or bubbles, among other names. Most of you will remember that there were once four of them. Now there are two, one at either end of the front, or west, side of the central building. One is a geodesic dome and the other an orange-peel. Of the other two, one was moved to the roof of FANX-III and the other was dismantled for refurbishing and future relocation. Domes like these, made of nylon or fiberglass skin on wood or aluminum frames, all transparent to radio waves, are designed for environmental protection, and the structure provides climate-controlled working space at the base for

maintenance and repair. Obviously, they can also be used for concealment of their contents.

(C) The highest platform on the roof is the penthouse top. It holds a parabolic dish which is sighted on another 4-foot dish on the FANX-III penthouse top. The two formerly served as backup for the gray phone system but are now being used for experimental work. Also mounted on the penthouse are discone, log periodic, whip and UHF/VHF antennas, and an anemometer. If you look down from your 9-story elevation to the north roof of the old 3-story building, you will see a cluster of antennas belonging to a staff element of the Operations Organization. A long-wire antenna cut to 32 MHz running along the north roof belongs to Telecommunications. On the east roof near the south end is another parabolic reflector. Then coming around to the south roof you have a spectacular view of a great white dish and two smaller ones, often sitting serenely in the "birdbath" position. They are the TRIO group, and they belong to an element of Operations.

(C) A cozier way to look at the TRIO system is on the monitor screens inside the antenna room where the staff keeps watch on it. Records stored in the antenna room include a TV film of the installation of the heavy TRIO components — a real cliffhanger. (One event the film doesn't show was the episode of the bus carrying members of the NSA Travel Club, which got mixed up in the moving operations and couldn't get out.) We can't show you the film in *CRYPTOLOG*, so here instead is "The TRIO Story," by   Technical Manager, T2243.

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### The TRIO Story.

(C) — TRIO consists of three separate antenna systems:



(C) — Installation required the cooperation of Scientific Atlanta (maker of the rotators and dishes), elements of the Operations, Telecommunications, and R & E Organizations, GSA, Fort Meade Military Police, safety officers, the fire department, the post rigger, and

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contractors. The contractors involved included Washington Technological Associates, Inc., Carter Helicopter, and United Rigging Company. The expertly trained Army INSCOM antenna team bore the brunt of climbing tasks and worked beneath the helicopter during the main component assembly.

(U) The pad area was cleared off by Antenna Services and WTA. United Rigging hoisted the rotators, dishes, and tower atop the roof and positioned these parts on the pad. WTA mounted the horn and rotator on the roof pad. They also mounted the 8-foot tower. The rotator was attached atop the tower. The 3-foot and the 8-foot dishes were mounted on this rotator with the use of scaffolding and chain hoists.

(U) On the day of the helicopter lift, a Saturday, the building wing was evacuated. Television crews, guards, fire engine crews, photographers, installers, safety officers, and others went to work on a murky morning. The pedestal, which weighed 4,500 pounds was helicopter-lifted into place and bolted down. The rotator, weighing 7,500 pounds, made the helicopter strain (its maximum capacity is 8,500 pounds). It was hoisted into place on top of the pedestal without a hitch. The two counterweights, weighing a ton each, were then lifted into place 16 feet above the elevator housing. The total time to lift and bolt into place was 50 minutes — preceded by weeks of planning and coordination.

(U) The 24-foot dish arrived three weeks later. It was raised to the roof by a Fort Meade crane. We were assisted by the INSCOM installation team and NSA volunteers. During this phase, March winds and freezing rains caused delays.

(U) All cabling and testing were completed by NSA personnel and specialists from the various equipment suppliers.

(U) The total preparation and installation time required (excluding pad fabrication) was 752 hours: 240 on the part of INSCOM, 222 by contractors, and 290 by NSA personnel.

\* \* \* \* \*

(C) To the west of the TRIO array, near the end of the south roof, stretch two series of loop antennas. These are Hermes aperiodic loop antenna systems designed as broadband receiving sensors for signals in the 2 - 30 MHz range. Since these are active antenna systems, they have the advantage of requiring less real estate than rhombics or log periodics without sacrificing signal gain. Directivity and beamwidth pattern is a combination of their orientation and of their end-fired termination.

(C) As you look out from your airy platform, three towers punctuate the view. On your right, to the southeast in the direction of S Building near the motor pool, is a tall tower with a reflector on top for line-of-sight microwave signals. The transmitting equipment is at the bottom of the tower. The signal could be transmitted through a cable, but since this would cause some signal loss, it is transmitted through space to the reflector, which aims it towards NSS, over on Nebraska Avenue. This is part of the old gray phone system and is a standard type of Western Union relay operated by the Chesapeake and Potomac Telephone Company.

(C) Scanning counterclockwise you will next sight a tower which is on Cooper Avenue. It is part of the Military Affiliate Radio System (MARS), an organization for amateur radio operators in the services, and thus not part of our story. The next tower you see, however, is very much part of the story. Located on Rockenbach Road, it was built under contract with Western Union and is part of the Washington Area Wideband System (WAWS). What you see is a 360-foot tower painted the conventional vermilion and white, with parabolic dishes mounted at various intervals along the top half and aimed in various directions. The flat covers over the faces of the dishes are for weather protection, and the cylinder between the reflector and the cover helps to reduce side lobes. The tower is connected by fiber optics to the communications center in the main building. WAWS will interconnect NSA, NSS, the Pentagon, Andrews AFB, Fort Detrick, and several other stations. Its capabilities are beyond anything we have ever had before.

WAWS and its capabilities are so important to us that we plan to provide you with an article about it in a future issue of CRYPTOLOG.

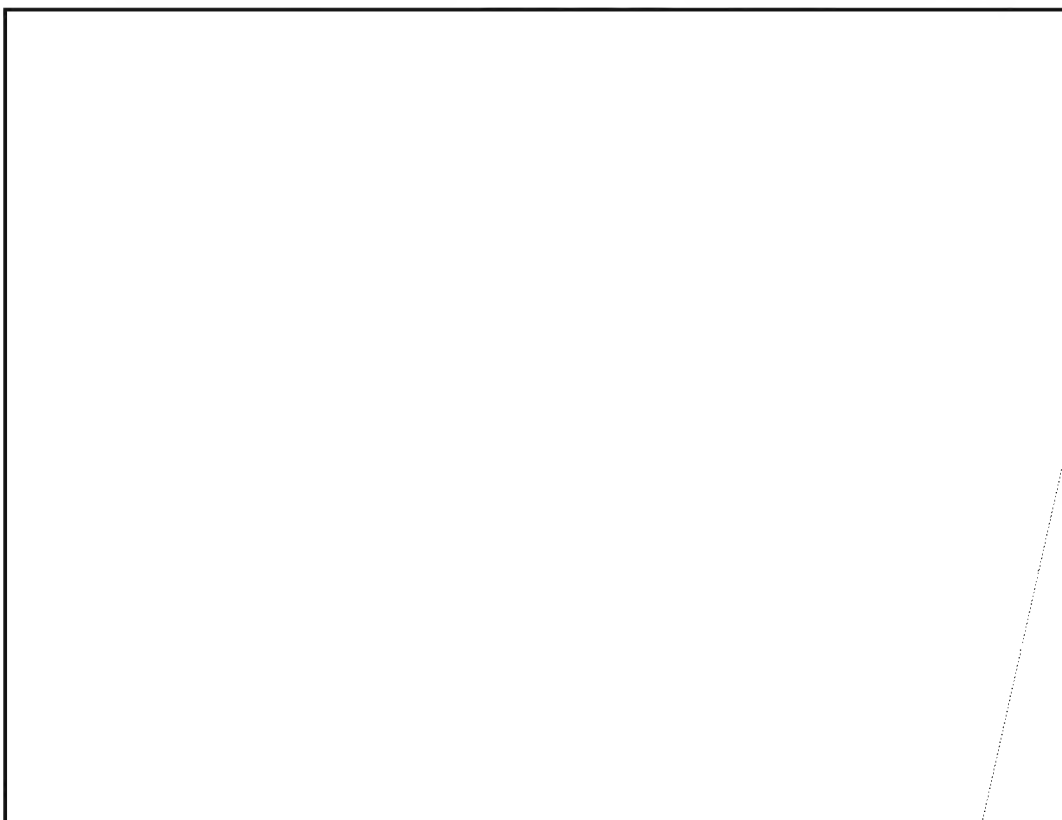
(U) WAWS is also connected with another array you can see from your rooftop viewpoint. Down below, to the east-southeast, loom the twin white dishes of DARING DUO, which also deserves a story of its own, and we hope to provide that for you too.

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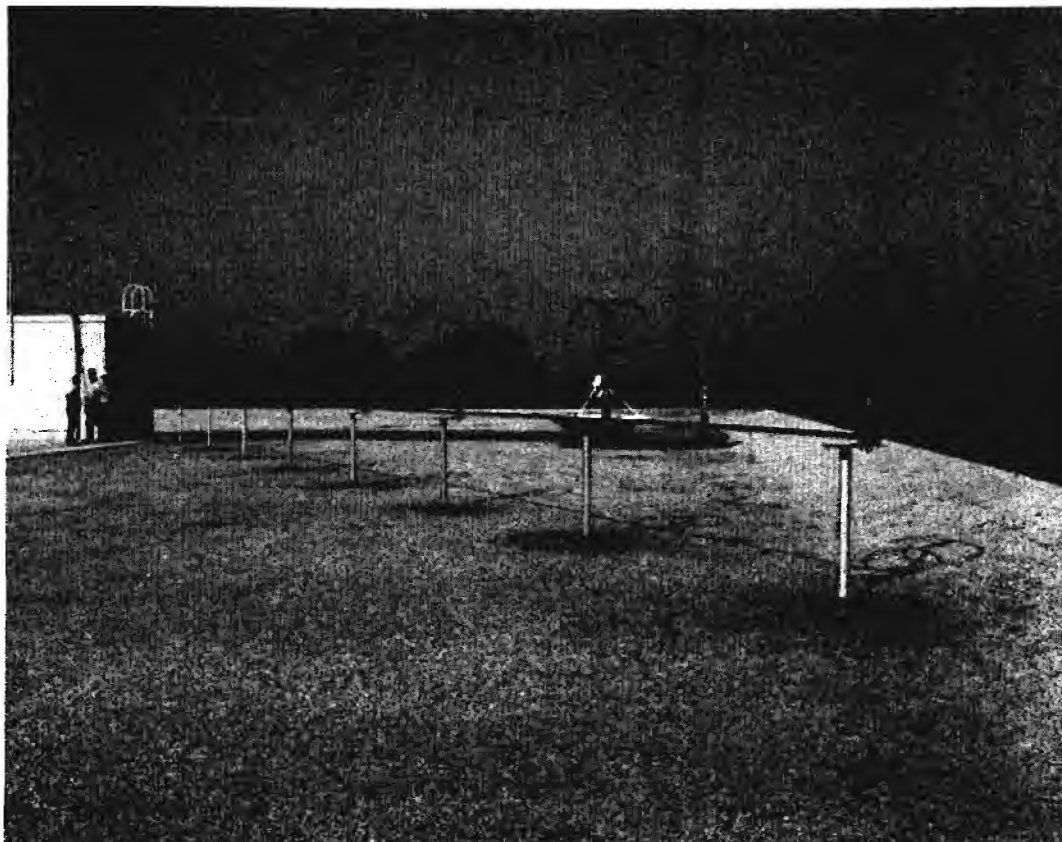
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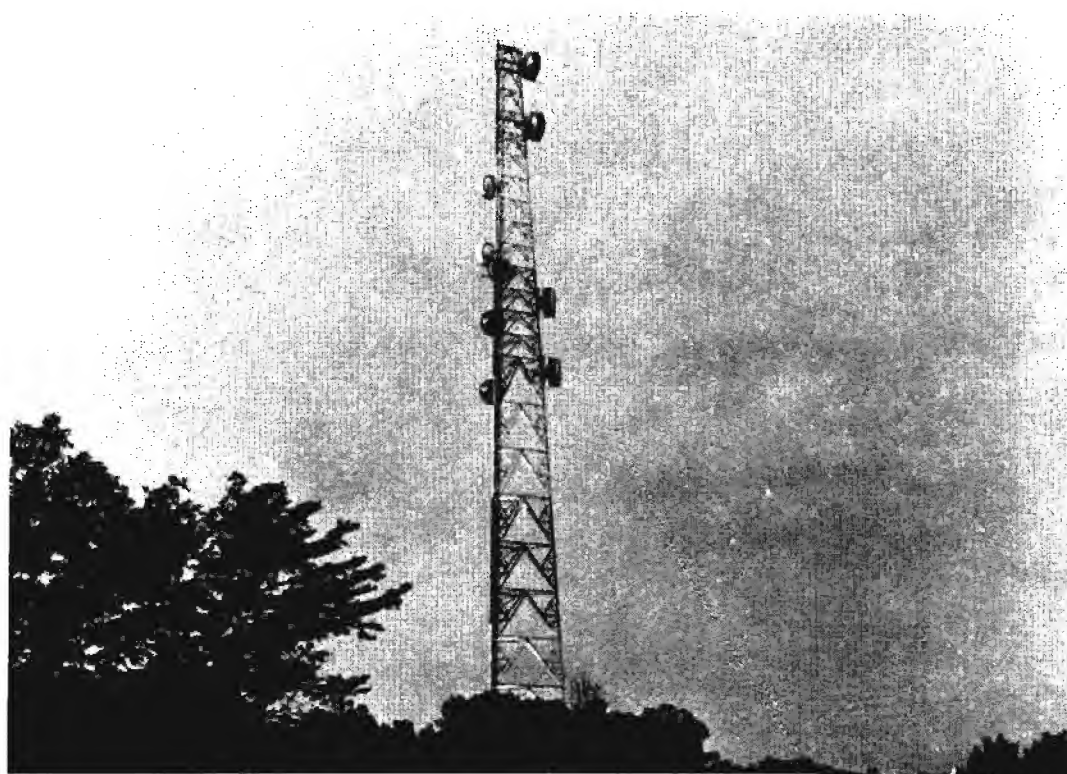
DARING DUO (U)



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Hermes Antenna



WAWS Tower



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(C) From any point of view the panorama of NSA's towers and masts and globes is quite fascinating (a poor man's Taj Mahal, said Brigadier Tiltman when we told him about our project), and those who do most of their roofwatching at FANX can observe changing skylines there too. We can enthusiastically recommend an excursion to the FANX-III roof with antenna experts like [redacted] of Research and Engineering and [redacted] of the School, especially on a sunny, breezy April afternoon with unlimited visibility. If you look west across the airport road you will see the low elevation that might have been the Cupola Hill of an earlier day. Now it supports navigational radars for BWI Airport. Off in the distance to the left is the MARS tower, then the WAWS tower, then a water tower, and then, to the south and southeast is the expanse of the airport. Round about you on the roof are such bits and pieces as the exhaust outlets for the boilers and the medical center, roof drains, metal grid walkways, and the aircraft warning beacons required by the FAA. But these are not the objects of our interest. The biggest such object is the lone white ball. It is part of the Research and Engineering antenna facility, although permission was given to Security to install two-way radio in this structure. Beside the ball on the same platform, and part of the same Security communications system, is a very long fiberglass whip antenna with an aircraft warning marker on top. Near the big ball is a 3-element yagi antenna, and if you stand behind it and look where it seems to be looking you will find yourself staring at the WAWS tower. Nearby is a round loop antenna with a center bar, probably designed for the HF or VHF range, and there is also a VHF/UHF TV array. Nearer the penthouse, which stands in the middle of the roof, is a very large parabolic dish with a protective cover on it and shrouded sides to suppress side lobes. The cover has the red flash marking of the Andrews Corporation painted on it. This dish is part of the WAWS. A much smaller dish near the south edge of the roof also has the red flash mark. Nearby is a DF-type loop with a rotator.

(U) Up on top of the penthouse at the highest elevation is another flash-marked parabolic dish. This is the one that looks at its mate on the Headquarters Building penthouse. The penthouse roof also holds a small whip antenna, a shelter for temperature and humidity instruments, and an anemometer. A most conspicuous feature up there is the big

discone, mounted point down, with its ground plane rods radiating beyond the edge of the penthouse roof. The rays have a coppery gleam, but they are made of anodized aluminum. At the north end of the east side of the FANX-III roof there is a short dipole antenna, then a long dipole strung along the rest of the east side, then a long wire running diagonally from the southeast corner past the penthouse to the northwest. On the edge of the front side, the south, are two 3-element yagis, one a little larger than the other.

(S) If you look down past the yagis to the left, you will find yourself gazing at the roof of FANX-II and the long black object on it. The building consists of two parts joined to make a Z-shape, and the black thing slants across the Z-bar to gain a length of about 600 feet. There was a good deal of speculation as to what might be going on when it and the little houses at its ends were under construction: executive escape hatches, special horizontal burnbag disposal [redacted] for elves... [redacted]

and it belongs to Research and Engineering, and that's all we can tell you about it. Anyway, it may have had one effect we heard suggested: it may have given the Russian photo analysts something to think about.

(S) Besides the tunnel, the most notable things on the FANX-II roof are the six condensing units for the air conditioning cores in the building, but there are antennas there too. In between the second and third units are three vertical gray fiberglass-domed cylinders standing on supports and all mounted on a platform. [redacted]

They are being used for training. Other antennas on the roof, some of them also used for training, include long-wire antennas, small discones (point up) and a large one (point down). Small discones are designed for VHF/UHF and the big ones for HF. Discone antennas are omnidirectional and can cover a broad band, up to several MHz. With backscatter they can receive signals from well over the horizon. VHF/UHF discones are much used for communicating with aircraft.

(U) When next you glance up at the NSA skyline, no doubt you will see that things are not quite as we have described them. But changes are always under way. New equipment was being installed and old equipment removed even as this article was in preparation. We hope nevertheless that it contributes to your interest in roofwatching.

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## ANOTHER SOURCE



L12



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Undoubtedly the most common method of acquiring new equipment here at NSA is through conventional procurement channels. But there is another source of supply for equipment sorely needed by our operational elements, one which avoids the anxieties and tensions which so often attend programming actions, such as the justifying of requirements, the competing for budget dollars, and the long waiting periods usually associated with procurement procedures. L1, the Office of Materiel Management, has the equipment for the asking.

Of course, there is a catch. The equipment is in most cases not brand new. But it is available without cost and it can be delivered quickly, usually within a week of the request. It is equipment which L12, the Plant Property Division, advertises on the excess bulletins which are published periodically and distributed widely. Even though nearly two hundred copies of these bulletins are distributed, there are still people who need equipment but do not know about them.

Throughout the federal government there are thousands of organizations that come up with excess equipment, for any of several reasons: the job for which the equipment was procured may cease to exist; newer equipment may supplant the original inventory; jobs, positions, or entire organizations may be disestablished; or any of a hundred other reasons may arise to eliminate equipment requirements. When equipment becomes excess in the Department of Defense, it is reported to the Defense Property Disposal Service (DPDS) for appropriate reutilization screening throughout the government.

Before equipment is transferred to the DPDS by way of a local area Property Disposal Office, it is advertised to the Cryptologic Community through L12's excess bulletins. There are two series of these — the inhouse bulletins, numbered in the 400s,

contain information on equipment turned in by the NSA elements (including field facilities); and the "out-house" series (a term we have been asked not to use), numbered in the 100s, cover equipment reported by the SCAs as well as NSA. NSA SIGINT equipment is advertised in both series. Since the bulletins are issued alternately, much equipment is available to NSA elements 30 days before it is advertised to the community at large. You may, of course, request equipment from either series.

During FY-79 NSA's participation in the reutilization program resulted in a saving of nearly five and a half million dollars. Specifically, 336 items were re-used reflecting a saving of \$5,458,102. Throughout the community, the total was closer to six million dollars (436 items, \$5,870,634). These figures do not reflect the value of the equipment involved, but rather the amount that would have had to have been spent to replace it. This in itself may be misleading: the dollar value shown in the reutilization of an AN/TNH-11 recorder/reproducer is approximately \$1,100, but you can no longer buy a new TNH-11. If a replacement machine must be purchased, it will have to be an AN/TNH-21 at \$5,000, more or less. Thus, when a TNH-11 is recycled, our figures will reflect a saving of \$1,100, where the actual saving might have been closer to \$5,000.

We are not limited to the Cryptologic Community for our equipment. You may request equipment from other government agencies. For example, during CY-79 one element obtained 46 items through DLA Excess Personal Property Listings, reflecting a saving of \$162,674. This external program may be the subject of a future article.

How do you determine the condition of a piece of equipment on the excess list? That's a reasonable question that deserves a better answer than is currently avail-

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able. The honest answer is that you just don't know — for sure. Each excess list contains a column listing the condition code for each item. Our in-house bulletins use the GSA condition codes which provide a reasonably well defined statement of the actual condition of the equipment — or a potential for a well defined statement. Unfortunately, many managers declare their excess property as O-3 (fair and usable without repair), regardless of its actual condition. We suspect that this usage is frequently the result of the rater not knowing the breakdown of the codes. In an effort to dispel some of the mystery, L122 included a list and explanation of these codes with the Cryptologic Community SIGINT/ADPE Excess Bulletin No. 139.

In the Cryptologic Community bulletins the condition codes are simply A or F. These letters do not stand for "awful" and "foul" as some people have suggested, but relate to the GSA condition codes as shown in the chart. Essentially, a rating of A indicates equipment, whether new or used, which is in excellent or good condition, while F denotes excellent or good equipment requiring repair, or

or equipment which is fair to poor.

To quote from a recent DLA newsletter:

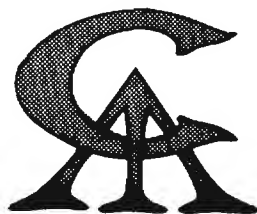
In today's climate of belt-tightening and limited budgets, it is essential that all of us explore every possible means of saving or stretching dollars and other resources. One of the best ways to accomplish this is through the reutilization of Department of Defense excess property. Activities which are not now participating in the DoD Reutilization Program are strongly encouraged to begin doing so; and activities which are already reutilizing excess property are urged to seek ways to obtain and use even more of it. In either case, the informed and systematic use of excess materiel from the Defense Property Disposal Service can significantly reduce expenditures for new procurement as well as the delivery time needed to actually get items in hand.

If you have any questions about excess property or the Reutilization Program, please call L122, 7264s/7906b.

#### CONDITION CODES AND EXPANDED DEFINITIONS

CRYPTO COMM	Condition Code	Expanded Definition
A	N-1	New or unused property in excellent condition. Ready for use and identical or interchangeable with new items delivered by a manufacturer or normal source of supply.
A	N-2	New or unused property in good condition. Does not quite qualify for N-1 (because slightly shopworn, soiled, or similar), but condition does not impair utility.
F	N-3	New or unused property in fair condition. Soiled, shopworn, rusted, deteriorated, or damaged to the extent that utility is slightly impaired.
F	N-4	New or unused property so badly broken, soiled, rusted, mildewed, deteriorated, damaged, or broken that its condition is poor and its utility seriously impaired.
A	E-1	Used property but repaired or renovated and in excellent condition.
A	E-2	Used property which has been repaired or renovated and, while still in good usable condition, has become worn from further use and cannot qualify for excellent condition.
F	E-3	Used property which has been repaired or renovated but has deteriorated since reconditioning and is only in fair condition. Further repairs or renovation required or expected to be needed in near future.
F	E-4	Used property which has been repaired or renovated and is in poor condition from serious deterioration such as from major wear and tear, corrosion, exposure to weather, or mildew.
A	O-1	Property which has been slightly or moderately used, no repairs required, and still in excellent condition.
A	O-2	Used property, more worn than O-1 but still in good condition with considerable use left before any important repairs would be required.
F	O-3	Used property which is still in fair condition and usable without repairs; however, somewhat deteriorated, with some parts (or portion) worn and should be replaced.
F	O-4	Used property which is still usable without repairs but in poor condition and undependable or uneconomical in use. Parts badly worn and deteriorated.
F	R-1	Used property still in excellent condition, but minor repairs required. Estimated repairs would cost no more than 10% of acquisition cost.
F	R-2	Used property in good condition but considerable repairs required. Estimated cost of repairs would be from 11% to 25% of acquisition cost.
F	R-3	Used property, in fair condition, but extensive repairs required. Estimated repair costs would be from 26% to 40% of acquisition cost.
F	R-4	Used property, in poor condition, and requiring major repairs. Badly worn, and would still be in doubtful condition of dependability and uneconomical in use if repaired. Estimated repair costs between 41% and 65% of acquisition cost.
X		Salvage. Personal property that has some value in excess of its basic material content but which is in such condition that it has no reasonable prospect of use for any purpose as a unit (either by the holding or any other Federal agency) and its repair or rehabilitation for use as a unit (either by the holding or any other Federal agency) is clearly impractical. Repairs or rehabilitation estimated to cost in excess of 65% of acquisition cost would be considered "clearly impractical" for purposes of this definition.
Scrap		Material that has no value except for its basic material content.

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## **COMMUNICATIONS ANALYSIS ASSOCIATION**

**PRESENTS**

### **ITS FIRST ANNUAL CONFERENCE ON COMMUNICATIONS ANALYSIS**

**THEME:**

## ***"THE ANALYST IN THE 80's"***

**CONFERENCE WILL BE HELD ON THE 15 & 16TH OF OCTOBER 1980,  
AT 0900 TO 1200 HOURS, IN THE FRIEDMAN AUDITORIUM.**

**THE THEME REFLECTS CONCERN OVER THE IMPACT THAT MANPOWER CONSTRAINTS, CHANGES  
IN THE WORKFORCE, AND THE EVOLUTION OF THE COMMUNICATIONS AND TECHNOLOGICAL ENVIRONMENTS  
WILL HAVE ON ANALYSTS IN THE FIELDS SERVED BY CAA.**

**CAA INVITES AGENCY PERSONNEL TO SUBMIT PAPERS OR ABSTRACTS FOR PRESENTATION AT  
THE CONFERENCE. SUGGESTED TOPICS INCLUDE:**

- **THE ANALYTIC RESPONSE TO A CHANGING ENVIRONMENT.**
- **SIGINT OPERATIONS, 1980 - 1990**
- **THE ANALYST AND AUTOMATION**
- **THE FUTURE OF TRAFFIC ANALYSIS**
- **COMSEC: CHALLENGES AND RESPONSE**
- **SIGINT REPORTING: THE CHANGES AHEAD**
- **INTEGRATING CRYPTOLOGIC DISCIPLINES**
- **THE DOCUMENTATION OF TARGETS & SOLUTIONS**
- **THE IMPACT OF PUBLIC CRYPTOGRAPHY**

**PAPERS OR ABSTRACTS OF PAPERS ON THESE OR OTHER TOPICS SHOULD BE SUBMITTED BY 31  
MARCH. FOR INFORMATION CONTACT BILL NOLTE, 677, 5A122 (5202s)**

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**NSA-Crostic No.29**

by D. H. W.

The trigraphs used in this puzzle are the standard codes for various North American airports. There are used here to represent either the airports themselves, or the cities which they serve. Happy landings!

A. BNA: Robert Altman film

26 144 30 157 112 48 60 40 70

B. When the 7:52 plane is supposed to leave (3 wds)

208 16 91 56 54 44 137 6 24 135 67 34

C. INT: City named after two cigarettes (comp)

81 1 166 193 183 204 5 232 87 240 178 259

D. Pertaining to an ancient people of Asia Minor

181 94 242 215 168 38 45

E. MCO: Tony's last name

194 118 171 182 100 151 206

F. Snobbishly arrogant (sl)

52 190 117 237 156 226

G. SAT flower (3 wds)

148 149 235 63 196 153 185 2 262 165 160 176

27 4

H. That which gives forth

231 126 152 136 175 113 200

I. YYZ: Largest city in the nation (2 wds)

187 225 161 133 264 180 17 99 195 244 37 203

250 234

J. Disability; frailty; moral weakness

98 88 253 35 90 47 77 138 243

K. MSP: Northern twin

13 172 86 79 221 92 256 115 9 210 53

L. Furnishes

146 246 32 170 233 177

M. Incorrect; irregular

154 212 164 230 263 223 73 192

N. ——— DTW: Character from *Guys and Dolls* (2 wds)

134 142 83 219 96 105 72 50 66 11 254 59 122

O. Farewell to CMH (2 wds)

3 89 57 42 169 71 39 21 12 132 213 141

238 127 80

P. Permission to pass (3 wds)

7 85 145 139 101 14 114 184 199 41

Q. ABE: Cities served by this acronymous airport (3 wds)

8 249 224 179 18 31 78 58 49 130 65 97 84

33 103 188 20 205 191 109 163 129 119 143

R. Make smaller

19 241 36 82 150 108 76 102

S. Arab prince

228 62 239 147

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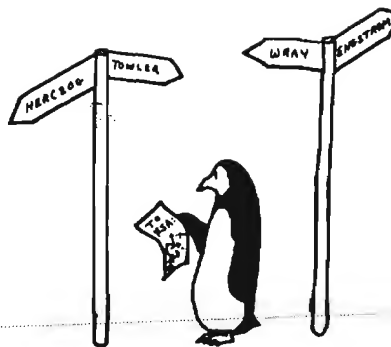
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# The Roads Around Us

by

[REDACTED]

P1



P.L. 86-36

Not many of us can accurately name the four roads which surround the HQ and Operations buildings at Fort Meade, and yet this information is in the public domain. Legible signposts exist for all to see, yet, as Holmes remarked to Watson, "You see, but you do not observe." (Quick now, try naming these roads yourself.)

Feeling that the exploits of the men for whom these roads were named should not be wholly forgotten, I have prepared the following notes on what could be learned after the passage of so many years. Further information from readers would be welcomed. rc.

## HENRY J. HERCZOG

After serving as an officer in the US Army Signal Corps from February 1943 to June 1946, Mr. Herczog joined a precursor of NSA as a civilian in July 1946. He served NSA with distinction until his premature death at the age of 40 on 4 September 1960. During his career with the Agency he received a number of letters of commendation for high performance in important missions and for his professional competence and technical abilities. He played an important role in developing and furthering a number of Agency programs, and was described by RADM Kurtz as "extremely competent and sincerely motivated...a natural leader."

Mr. Herczog also found time to serve as President and later Chairman of the Board of the Government Employees Benefit Association (GEBA). He wit and friendliness made him popular, and as a speaker he was among the best.

The road that runs from east to west past Gatehouse 4 is named in his honor and memory.

## HOWARD T. ENGSTROM

After attaining the rank of Captain in the Navy during World War II, Mr. Engstrom, along with LCDR William Norris and others returning to civilian life after serving in the Navy's CSAW (Communications Supplementary Activity, Washington) were successful in forming a private company — Engineering Research Associates. ERA set up shop in St. Paul, Minnesota, and was kept going by US Navy contracts covering such specific tasks as building special purpose electronic data processing devices and research on data handling and storage techniques.

From NSA's point of view the significance of all this was ERA's successful design and construction of the ATLAS computers, an affair which kept Mr. Engstrom in contact with the higher officials of NSA. He joined Remington Rand when that company bought out ERA in 1952, and became a member of the NSA Scientific Advisory Board. After Remington Rand in turn merged with Sperry Gyroscope to become Sperry Rand, Mr. Engstrom took leave from his company to serve NSA, first as Deputy Director of Research and Development (1956 - 1957), and then as Deputy Director of NSA (1957 - 1958). After returning from NSA to become a vice president at Sperry Rand in 1958, he was awarded the first NSA Exceptional Civilian Service Medal on 17 February 1960.

Historian Samuel Snyder tells of the meeting held on 10 March 1958 to discuss the HARVEST concept. After Snyder and others argued in favor of HARVEST, Mr. Engstrom spoke strongly against it. He was overruled by then-Director LGEN Samford. (There are those who still think his advice was the best in the HARVEST case.)

From the eulogy printed in the NSA Newsletter following his death in March 1962, we take the following:



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He will be remembered by his many friends in NSA as a big man in every respect, never failing to greet and show a warm and cordial interest in the affairs of others, though he was always preoccupied with solutions to many difficult problems.

The road that runs from north to south past Gatehouse 1 is named in his honor.

#### WILLIAM D. WRAY

In early 1942 Dr. Wray came to the Navy Department as a Mathematician, Grade P1, the grade given in those days to college graduates with bachelor's degrees. (His PhD in applied statistics was ignored.) He and Dr. Robert E. Greenwood were almost the only civilians in their working area, and the atmosphere on the job was not pleasant. But Dr. Wray had contended with handicaps since a childhood illness had left him with permanent medical problems. Patriotic conviction kept him with the Navy. His refusal to be discouraged proved itself on many occasions and commended him to everyone. He came to be a confidant and advisor to many.

Dr. Wray's steady good judgment, his objective steadfastness and his ability to get along with people and encourage them made him a good administrator. He was steadily advanced, and his early death, at 52, in 1962 was a serious loss to NSA as well as to his family and friends.

The road that runs from west to east past Gatehouse 2 is named in memory of Dr. Wray.

*My thanks to Howard Campaigne, Sam Snyder, [redacted] for help with these vignettes of the past. re*  
\* \* \* \* \*

#### NCS SUMMER LANGUAGE PROGRAM

Applications are currently being accepted for the Agency's Self-Help in Language Growth Program for the summer of 1980. This program is designed to upgrade the skill of linguists through full-time summer language programs at accredited academic institutions. such as Middlebury (Vt.) College, the University of Illinois, etc. Students receive full pay, but all other expenses are their own responsibility. Individuals approved are issued "permissive" TDY orders which authorize time off only. They must make their own travel and housing arrangements.

To qualify, an applicant must

- ★ be an NSA civilian career employee with at least two years of SIGINT experience of equivalent military experience.
- ★ request training in the language in which he is currently working, or in a language designated by management as necessary to the Agency's mission
- ★ possess certain minimum language proficiency qualifications
- ★ be accepted by the school of his choice

Applicants should submit an External Training Request (Form E5824) through channels to the Registrar, NCS (E81), by 30 April.

#### COL HARRY E. TOWLER, USAF

A member of the US Air Force Security Service, COL Towler served as Vice Chief of Staff. 1950 - 1953. He was then assigned as Commander, 6950th Security Group, Chicksands Priory, England, where he served until 1956. He was then named Chief AFSSFM/GENS-3, under an arrangement in which the Director, NSA, exercised management in partnership with the Chiefs of the SCAs. In both roles COL Towler interacted daily with members of many Agency elements, at all levels, while remaining responsible to Commander, USAFSS, Kelly AFB, San Antonio.

A memoir received from then-SSGT Billy J. Baker includes the following comment:

I remember COL Towler as being the finest commander it was my privilege to serve under in my 21 year military career. He was a large man who tempered his military bearing...with a fatherly concern for the welfare of all his men.

At a masquerade ball at the Chicksands NCO Club in 1954, COL Towler created a memorable impression by appearing as Henry VIII, his rotund figure covered with jewel-encrusted velvet, his eyes winking merrily atop a flaming red beard as he gave the wives the opportunity to dance with a king.

The road running from north to south past Gatehouse 3 is named in his memory and honor.

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# The 2000-Year-Old Transcriber

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**S**ome veteran professional athletes have been trying to hang on with their teams into the 1980 season, in order to say that they played in four decades — the fifties, sixties, seventies and eighties. It made me realize that there are some people around who have been associated with voice transcription at the Agency and in the field during those same four decades. Thinking that it might be useful to document the changes that have taken place in transcription over the years, I set out to interview the 2,000-year-old transcriber.

I found him, sunning himself outside his cave in the woods beyond the Ft. Meade rifle ranges. He readily agreed to the interview, and we spent a pleasant afternoon retracing years of transcription history, our conversation broken occasionally by the fire of weapons on the ranges or the passing of a Metroliner on the nearby railroad tracks. A transcript of that interview follows.

Q. Sir, could you tell me about the transcription organizations of old?

A. Yes, they were a lot smaller and simpler than those you have over at the puzzle palace nowadays. The Phrendian problem was always the largest, of course, but I can remember when there were only 50 or so of us in the whole Phrendian transcription shop. The organization was split into two sections; that made it easy to form sides for the softball game at the annual Phrendian Transcription Branch picnic. Actually, come to think of it, there was another part of our outfit called the "Vault."

Q. Why was it called the "Vault?"

A. Because it was in an actual vault; it may still be there at the south end of the second floor center corridor. It was one of the first exclusion areas. The vault kept the secrets in; unfortunately, it also kept the fresh air out. A lot of people who worked in there developed TB.

Q. Tuberculosis?

A. No. Tiny bladder. To get out and get some fresh air, you went to the bathroom a lot.

Q. Not to change the subject, but what were the early voice recordings like?

A. You have to remember that I only go back 2,000 years. Some of the oldtimers used to talk about transcribing from wax discs or recordings on piano wire, but they had progressed to magnetic tape by the time I came on board. Of course, the quality of the tape at first was not so good; the oxide surfaces weren't as developed as they are now, so the fidelity wasn't as true, and you had to play the tapes at higher speeds; also the tape was thicker and, combined with the high speeds, you couldn't record as much as today on a given sized reel.

Q. And the recorders? What were they like?

A. Oh, boy! If today's beginning transcribers could see them, they would laugh; if they had to use them, they would cry.

Q. They were that bad?

A. Well, they weren't designed for the wear and tear of transcription. They were just commercial recorders. If you put a tape on one of them, played it for half an hour or so at a time, and then turned it off, it was fine. After all, that's what these recorders were designed to do. But when you tried to go back and forth, back and forth over garbled passages or to run them a lot on fast forward or reverse, they soon went kaput.

Q. What brands were they?

A. One of the most common was the Revere. It was used almost exclusively in our shop. The recorder came in a pebble-grained brown case, complete with carrying handle, and it rested face up on your desk. It had plastic piano key controls for the recorder functions. I think most of the insides must have been plastic too, as fragile as they were.

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Q. And the other models?

A. The other type that predominated was the Magnecorder PT-6. It had a grey case and was an upright model. It was barely taller than the 7-inch reels that you played on it. It had one knob that you turned to different positions for all the functions. With all the turning of that switch in transcription, the insides of that recorder took a real beating. A little later we also got some Magnecordettes, which had a 2-track capability. And finally we started developing special transcription recorders, like the AN/TNH-11, and later the AN/TNH-21.

Q. Did those early recorders have any special features to help the transcriber?

A. Are you kidding? They had zilch to help the transcriber. Things you would take for granted today, we didn't have. Take the variable speed control that lets you slow down a difficult passage; our variable speed controls were the fingers on our left hands. We would press them up against the edge of the supply reel and vary the pressure to slow down the tape. It distorted the recording, of course, but it did slow it down to where we at least thought we had a better chance to recover a tough word or phrase.

Q. That sounds like it might have been hard on the recorder.

A. Sure it was. Frequently the rewind function would give out. We would stick a pencil in the reel and rewind it manually, until we got tired of doing that and called for repairs. You had to improvise in those days. Another example: your recorders today have counters, so that you can note the exact positions on a tape you might want to hear again. On the Magnecorders there were no counters. We used to tear off little scraps of paper and stick them in the tape to mark those places. By the time you got to the end of a particularly bad part, it was two-toned — brown and white from all the paper stuck in it. Then when you rewound the tape, you had to be careful to stop it in time, or else you went by the marked spots, and the little pieces of white paper would go flying off across the room... "phfft"... "phfft"... "phfft." Oh, and those early recorders would not cut off automatically when the end of the tape ran out. If you weren't there to stop it immediately, the reel kept turning and the tape either spilled out onto the floor or got wrapped around the capstan.

Q. I guess that earphones have changed a lot over the years?

A. You bet. The early ones were functional, but uncomfortable as hell. They were what radio operators for years have called "cans." The part that went over your ears was hard

plastic; the bare metal bands that went over the top of your head were adjustable, and the moving parts would scrape and pinch your skin. At the end of the day you went home with rose red ears and your hair parted sideways.

Q. Did you go right from those to the individually molded earphones that are used today?

A. Oh, no. First the electronics companies came out with "muffs," the kind that most people use with their home stereos today. They were much more comfortable around the ears, but kind of bulky and heavy to wear all day. Before long, we switched to the Telex type, with extremely light plastic headbands and the little tips that went into the ear. Then somebody hit on the idea of individually molded earpieces.

Q. Do the earmolds help you hear better than other types of headsets?

A. I don't know. People have debated that for years. Some say they really make a difference; others think it's all in the mind. I'll tell you what's the best thing about the moldies, though; it's the expandable cords that go with them.

Q. How does that help?

A. Well, if a good-looking girl walks by, you can wheel around for a quick double take, without suffering whiplash.

Q. I guess with the earmolds and expandable cords, the state of the art for earphones has gone just about as far as it can go?

A. I used to think so, but the other day on my portable radio I heard that some rock groups are now operating with *cordless* electric guitars. A tiny transmitter in the guitar beams the music to the amplifiers, and the guitarists are free to romp all around the stage, without getting tangled up in their own or each other's cords. So maybe there will be cordless earphones in the future. I wouldn't expect to see transcribers dancing around the transcription shop, though, because they are still tied down to the keyboard.

Q. Speaking of keyboards, what were the early ones like?

A. We didn't have any "keyboards." We had "mills," old-fashioned manual typewriters. And, of course, they weren't connected to cathode ray tubes; we had to bang out transcripts on 5- or 6-ply paper. The paper had holes down the sides, and on both sides of the typewriter carriage were metal sprockets; the sprockets were supposed to mate with the holes and insure that all the multi-ply remained aligned as the carriage moved. When you finished the transcript, you had to separate the copies and pull out the carbon paper. We eventually went to

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Selectric typewriters and carbonless paper, both of which made transcript preparation easier. And then, of course, came keyboards and CRTs, which allowed "paperless" transcription.

Q. Have people always transcribed at desks?

A. No, there have been attempts to develop a special transcription position. In fact, a number of positions were produced and used for a dozen years or so at the Agency. I guess they were officially called Transcription Consoles. We just referred to them as "consoles."

Q. What were they like?

A. They looked like somebody's idea of a Cape Canaveral space console. They were silver metal cabinets with a shelf for a typewriter, an upper rack tilted away from you, for the recorder, and usually more shelf, rack and drawer space on one or both sides of the recorder, depending on whether you had 1/3, 2/3, or 3/3 of a position, since they came in detachable modules.

Q. Were they better than a plain desk?

A. Overall, they were worse.

Q. How so?

A. They were "camels."

Q. Camels?

A. You know, the old saying that a camel is a horse that was designed by a committee; I think that's what happened with the consoles. They incorporated some good ideas; for example, the typewriter shelf was at a lower, more natural, level than a desktop. In general, though, they were more a frustration than an aid.

Q. What were some of the problems?

A. As I recall, you couldn't reach the recorder from your seat, the drawer space was insufficient for the working aids and supplies you needed, and all the distracting noises that recorders, footpedals and typewriters make seemed to be magnified by the metal and the hollow spaces within the consoles.

Q. What happened to them?

A. They began to wear out, and people turned them in for junk as soon as they could. I certainly hope that by now they've been recycled into something useful, like beer cans.

Q. Have there been other attempts to improve the lot of transcribers?

A. Oh, yes. Transcribers, engineers and contractors have come up with various ideas, intended to make transcription better, or at least easier.

Q. For example?

A. Well, people have always been obsessed with reducing the noise in transcription areas. The clicking of footpedals and recorder parts and the clattering of typewriters sometimes add up to a real hubbub.

Q. What did they try to do about it?

A. At one time they decided to test a variety of sound-deadening measures in one transcription section. First they came in and took decibel readings of the noise level in a typical transcription area with tile flooring, concrete walls and metal consoles. Then they installed carpeting on the floor and drapes on the walls and put pads under the typewriters.

Q. What were the results?

A. The area *looked* real nice with the carpeting and drapes. One drawback was that your chair wheels would catch in the rug when you tried to move, and you would go toppling over onto the floor. To remedy that, they put hard pads under the chairs. Eventually, they came back to take decibel readings again.

Q. And..?

A. Supposedly, there was no significant reduction the the noise level, so nothing ever came of it. We were a little let down, but our disappointment was cushioned by an article in the news at that time. It seems that a new office building had recently been constructed in West Germany, incorporating all the latest sound-deadening techniques at great expense. The soundproofing was so effective that the office workers were disoriented by all the silence. Turns out that they had to pipe in typical outside sounds — traffic, birds, airplanes, and the like — to put the workers back at ease.

Q. What else has been tried to help transcribers?

A. One of the silliest ideas was to replace the typewriter with a Stenotype machine. Supposedly, we would have sat there, clacking out shorthand symbols on a Stenotype, keeping up with the recording, and never having to stop and go over anything. The Stenotype tape would have been fed into a device that would convert the symbols back into words on a transcript.

Q. Would that have been the SPELLMAN project?

A. Yes. That was the name of it. How did you hear about that?

Q. There have been some articles about it in CRYPTOLOG.<sup>1</sup> You didn't think too highly of it, then?

A. The only thing that might have been worse was the stereo delay experiment.

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Q. The stereo delay experiment?

A. I don't know if that's what it was officially called. Some electronics engineer had the idea that transcribers could hear more clearly if the recorded voice was to be placed on each of two tracks. One track would be fed into the left earphone and the other track — with the same recording — would be fed into the right headphone. The catch was that there was a delay of a small fraction of a second between what you heard in your left and right ears. Supposedly, this delay would increase your aural acuity.

Q. And it didn't do anything for you?

A. Oh, yes. It gave us headaches. Here those engineers were getting paid twice as much as we were to come up with cockamamie ideas like that. I think they kept them down in the basement too long in those days.

Q. Haven't there been any innovations that have really helped transcribers?

A. I can't think of any. A lot of the developments have made transcription more *comfortable*, but not really easier. And new technology sometimes causes new problems. For instance, the old mills and 6-ply paper were a pain to use, but with the new CRTs you have to guard against things like radiation

or the eyestrain that's caused by "CRT glare." I understand they've been working on a way to convert speech into a digital form, so it can be manipulated and enhanced to smooth out the garbled parts. I'm skeptical, but you never know. After all, who would have predicted cordless electric guitars?

Q. Can you think of anything else in the way of past developments that have affected transcription?

A. No, but like I said, I only go back 2,000 years. Some of the oldtimers might be able to fill you in about the earliest days.

Q. Just one last question. How do I get back to the Agency from here?

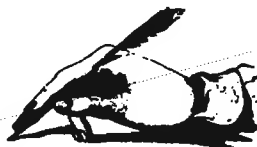
A. That's easy. Just follow that path there; it will take you to the rifle range road. And when you get back to the building, please say hello to General Canine for me.

<sup>1</sup> Notably, "I Remember SPELLMAN," by Arthur Salemme, Jul 78. Also, "More B.S. (Before SPELLMAN)," by [redacted] Oct 78. A somewhat more optimistic view of this concept can be found in "Shootout at the SIGINT Corral," by [redacted] Jul 79.

Solution to NSA-Croctic No. 28, CRYPTOLOG, August - September, 1979.

"[Mokusatsu:] One Word, Two Lessons," by [redacted]

"[One] problem that keeps every word in one language from having a counterpart in every other language is that often something which is commonplace to speakers of one language will be...unknown to speakers of another... How, for example, do you translate "anchor" into a language spoken by nomad[s]...in the midst of the Sahara Desert?



## Letters to the Editor

P.L. 86-36

To the Editor, CRYPTOLOG:

I enjoyed reading the humorous account of [redacted] early experiences with computers at the Agency ("On Coming of Age at NSA: Confession of an Ex-Linguist," CRYPTOLOG, August-September 1979). I would like to point out, however, that ROB ROY was not the first system to "have remote use terminals ever." ROGUE was! ROGUE (Remote Operated General Use Equipment), installed at Arlington Hall Station, had four remote terminals (Flexo-writers), each located in a different analytic area: three were in A Building, for GENS, ALLO and ACOM, while the fourth was in B Building, for ADVA. As with ROB ROY, the terminals were serviced serially.

Delmar L. Taylor  
Chief, T331

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# CLA NEWS

For the Spring of 1980, the Crypto-Linguistic Association announces two contests:

## THE SYDNEY JAFFE AWARD

In 1972 the CLA established the Sydney Jaffe Award as the Agency's highest recognition of exceptional achievement in the field of language. It is given to persons, either civilian or military, who have made major contributions to the mission of the cryptologic community in the tradition of scholarship, leadership, and accomplishment exemplified by the late Dr. Jaffe, the first President of the CLA.

The award may be given for any aspect of language endeavor — operational use, research, training, development of new technology, or management.

Candidates may be nominated by any three members of the cryptologic community, by the Chairman of the Language Career Panel, or by any supervisor at office level or above. Nominations should include a statement detailing the candidate's accomplishments in the language field and specifying how they have contributed to the Agency's mission.

Selection will be made by a committee composed of representatives of each of the major NSA organizations which employ linguists.

Nominations should be submitted to CLA President [redacted] G95, 2A158, ext 5882s, by 1 May.

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## CLA ESSAY CONTEST

Submissions of the annual CLA essay contest are now being accepted. The deadline for entries is 1 May. Any paper in the fields of language or linguistics written by a member of the CLA is eligible; papers by non-member Agency personnel are eligible if sponsored by a member. While it is preferred that entries be original material written specifically for this contest, previously published items will be considered.

First prize is \$100, second prize is \$50, and third prize is \$25. Entries should be sent to the CLA Secretary, [redacted] A624, ext 5157s.

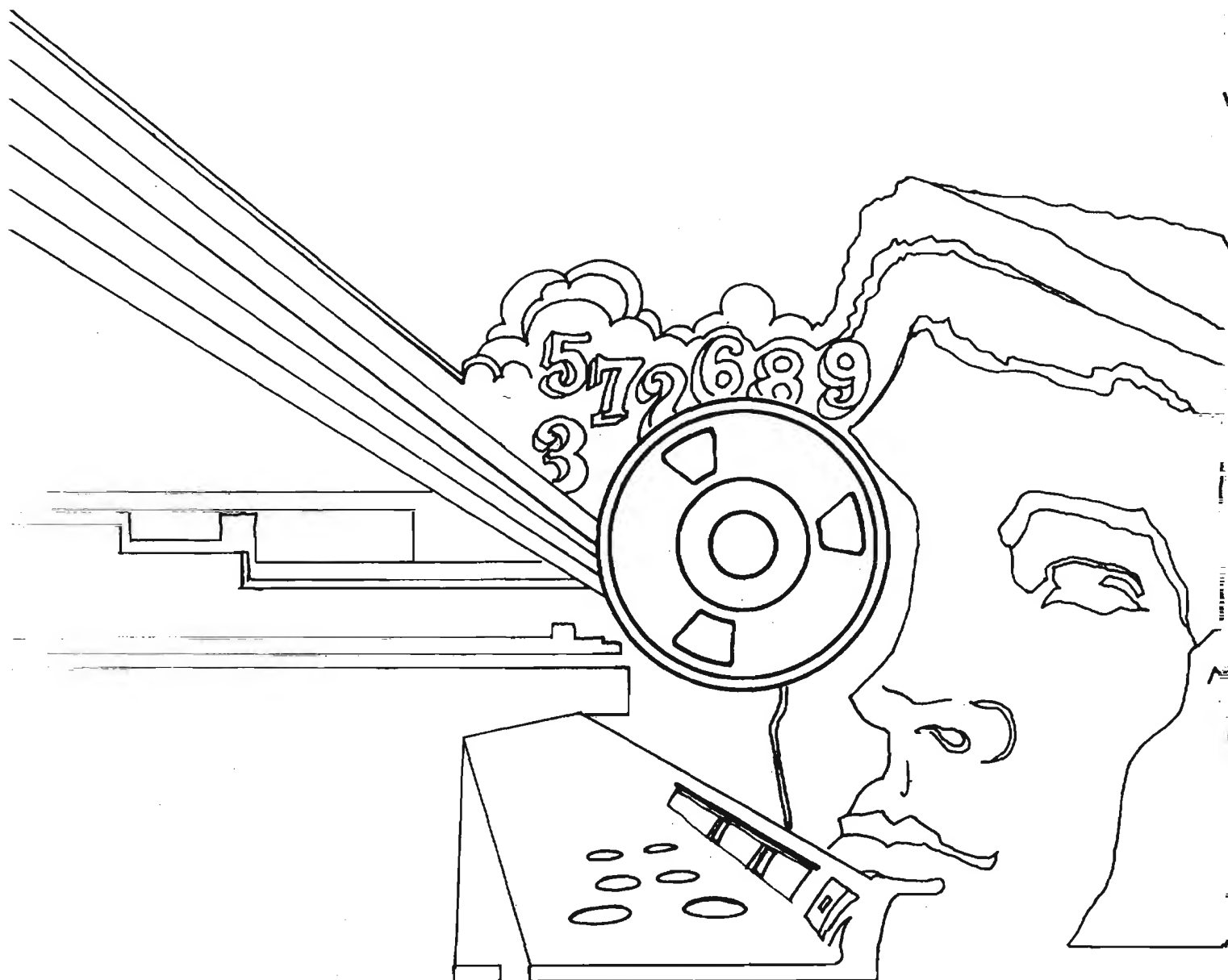
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